

Saturn Workshop -10

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Statement of

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Administrator

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

before the

Subcommittee on Independent Offices
Committee on Appropriations
United States Senate

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Mr. Chairman and Members of the Subcommittee:

We are here today to present the President's request for appropriations for the National Aeronautics and Space Administration for Fiscal Year 1969. Appearing with me today are most of the senior officials in NASA, including the Associate Administrators in charge of each of our Program Offices, who are prepared to justify their programs in such detail as you may wish. Also here today is our new Deputy Administrator, Dr. Thomas O. Paine. Since joining NASA last March, Dr. Paine has devoted his time primarily to becoming familiar in considerable depth with the NASA organization and its operations. He has completed visits to most of our field centers and initial reviews of our principal activities, and he is ready now to assume his full responsibilities as Deputy Administrator.

The current situation with respect to NASA's budget for FY 1969 is shown in Table 1, attached. In summary:

- The President's FY 1969 Budget recommended an appropriation of \$4,370.4 million.
- The authorizations approved by the House in H.R. 15856, passed on May 2, totalled \$4,031.4 million.
- The appropriations passed by the House last week in H.R. 17023 totalled \$4,008.2 million.
- The Senate Committee on Aeronautical and Space Sciences has recommended to the Senate authorizations totalling \$4,150.6 million.

With respect to these actions, I would like to make three main points:

First, the NASA budget has been severely reduced. The President has already taken vigorous action to reduce the NASA budget to take account of the difficult fiscal situation and other national priorities. Last year he reluctantly accepted the \$500 million reduction made by the House Appropriations Committee in the FY 1968 budget. For FY 1969, his budget request was \$700 million below his request for FY 1968, and \$200 million below the amount appropriated for FY 1968. Under this budget, NASA expenditures in 1969 would be \$230 million below FY 1968, \$850 million below FY 1967,

and more than \$1.3 billion below FY 1966. Under the President's Budget, by the end of FY 1969 total contractor, university, and government employment on NASA work would have declined from a peak of 420,000 to about 235,000. We estimate that the reduction of \$362.2 million by the House would mean a further reduction of approximately 20,000 in total employment.

The second point is that we are not authorized to request the Committee to restore the reductions made by the House. In view of the crucial importance of securing favorable Congressional action to increase taxes at this time, and in view of the fact that the legislation pending in Congress has tied approval of the tax increase to a substantial further reduction in federal expenditures, the President has instructed us not to request approval of an amount in excess of \$4,008.2 million.

The third, and I believe the most important, point is that in taking these actions both the President and the House, and now also the Senate Committee on Aeronautical and Space Sciences, have clearly endorsed the need for continuing and not abandoning a strong program in aeronautics and space. The reductions that have been made by the President and by the House of Representatives, as shown by the reports of its Committees and the debates on the Floor, have been based on

financial considerations related to the overall national fiscal and economic situation, not on the merits of the program.

You will appreciate, I am sure, that our current situation places us in a difficult position as we appear before you today. We are not able to state to you precisely what actions we will have to take if our total appropriations for FY 1969 are at the \$4,008.2 million level. It is not possible to absorb a reduction of this magnitude without considerable damage to the nation's capabilities in aeronautics and in space. Nevertheless we will endeavor to carry out, as best we can, a productive program in space and aeronautics at the lower level and will need as much flexibility as you can provide. We will not be able to lay out our operating plan for FY 1969 until Congressional action has been completed and we have some indication as to the amount that will be available. Today, we will attempt to outline the principal problems and alternatives we face, and we will be prepared to present the operating plan when we are in a position to do so.

Let me conclude these introductory comments by stressing the special importance to NASA in FY 1969 of flexibility to handle the difficult adjustments made necessary by the substantial reductions in our programs and operating levels. The House of Representatives has recognized this need. The Authorization and Appropriations Bills as passed by the House

include the reprogramming and transfer provisions carried in previous years. In addition, the House Appropriations Committee this year has omitted detailed amounts from its report, and the Chairman of the Subcommittee stated in the debate on the Floor of the House that NASA should have flexibility in allocating and reprogramming the funds that are made available so as to best absorb the substantial cuts that are made in view of the budgetary situation. I can give you two examples of where the need for flexibility may be especially important.

- The House reduction in "Administrative Operations," as I will explain in more detail later, would require a reduction in NASA personnel that is out of line with the workload and heavy flight schedule requirements of high priority programs now underway, such as Apollo. We also have an urgent need to maintain an adequate technical and management base for a balanced program at the \$4 billion level. We will, of course, have to further reduce personnel, but a viable and balanced program to meet the overall objectives which justify a \$4 billion program in FY 1969 will require substantially larger funds in "Administrative Operations" than the \$603.2 million passed by the House. In addition, we will have to face the problem of the civilian pay raise

scheduled to become effective on July 1, 1968, for which no provision was made in our budget estimates.

The Senate Committee on Aeronautical and Space Sciences has recommended a level of \$635.6 million for Administrative Operations.

- For the Nuclear Rocket Program, the amount of \$11.7 million authorized by the House is not sufficient to provide, in addition to supporting research and technology, for orderly termination of the technology test program now underway, let alone to continue these tests as endorsed by the House Committee on Science and Astronautics, which recommended this amount. Our current estimates are that to complete the technology test work underway and to continue a meaningful level of supporting research and technology -- without initiating development of the NERVA flight engine -- would require a total of about \$38 million in 1969. The Senate Committee on Aeronautical and Space Sciences has recommended a level of \$55 million of the \$60 million request for the nuclear rocket program. This action includes a recommendation that the development of the NERVA engine proceed.

If our total FY 1969 appropriations are limited to \$4,008.2 million, the amounts for all such adjustments will have to be reprogrammed out of other amounts finally authorized and appropriated. As a consequence, reductions will have to be made in many research and development programs. We cannot state in detail at this time what adjustments we would have to make, but will do so when we present our FY 1969 operating plan.

Seven main areas of interest in our budget merit comment:

1. In the Apollo program, we are proceeding generally in accordance with the revised plan and schedule we discussed with you last September. The first flight of the Saturn V launch vehicle on November 9 was an unqualified success. The unmanned test of the Lunar Module in January enabled us to determine that a second unmanned flight test of the Lunar Module was not necessary. This second unmanned LM flight, therefore, has been deleted from our schedule and, unless problems develop in ground tests in the next few months, the next flight of the LM will be a manned flight, by the end of this year or early next year. The second unmanned flight of the Saturn V, on April 4, 1968, encountered problems with the J-2 engine, in both the S-II and S-IVB stages, and certain other problems with the Saturn V launch vehicle, which at first

made it appear that a third unmanned test flight of the Saturn V launch vehicle would be necessary. Careful analysis of the test data, however, has now permitted us to pinpoint the cause of the difficulties, lay out the methods and procedures for correcting them, and give us confidence that if the "fixes" we will be making are successfully proven out in ground testing we can fly men on the next Saturn V launch. Accordingly, we are now proceeding on the basis that the next Saturn V flight will be manned, but are also holding open the option of another unmanned flight should the results of our ground testing indicate that it is necessary.

As a result of these decisions, we now expect that the next flight in the Apollo program -- Apollo 7 -- will be a manned mission launched by a Saturn IB and testing the new Block II spacecraft, probably in the third quarter of this calendar year. If this test goes well, and if our ground test program on the Saturn V "fixes" goes well, the following flight will be a manned launch of the Saturn V toward the end of 1968, or early in 1969, carrying both the Command Module and the Lunar Module for manned tests in earth orbit. After that, we will proceed with the Saturn V launches scheduled for calendar year 1969. At this time I believe that it is still possible that we may be able to attempt a manned lunar landing during that time.

We are rapidly approaching our goals in the Apollo program, and it is essential that we have available to us during this period the resources needed to maintain the momentum of the effort and respond flexibly and promptly to new problems as disclosed in our test program. We must be able to make the necessary "fixes" without costly delays. I urge the Subcommittee to continue to give the Apollo program its full support.

2. The Apollo Applications Program is oriented toward the long-range objective of a Saturn V Workshop as the major objective that would follow Apollo in our manned space flight program. Such a workshop can provide a large, long-life orbiting base for continuing the development of scientific, applications, and possibly national defense capabilities in space. As steps toward this objective, Apollo Applications funds that are appropriated for FY 1969 will be used to continue work toward use of the Saturn I Workshop for biomedical and other experiments, for solar astronomy experiments and for the Apollo Telescope Mount. We hope to launch the first Saturn I Workshop in late 1970, with one or more revisits to develop the re-supply know-how. The Apollo Telescope Mount experiments would then take place over the following period of months. Depending on the funding level, we will consider the possibility of having a second Saturn I Workshop and a second

LM/ATM combination available for backup use in these early development phases of what may well become the first major pay-off use of the Saturn V booster.

Our progress to date has been limited by the need to hold down expenditures in FY 1968 and those projected for FY 1969. Our detailed plans and schedules, as well as the rate at which we can develop the Saturn V Workshop, depend heavily on the amount of funds that we can apply to AAP in FY 1969. The amounts provided in the House Bill will barely keep the program alive. At this level it will be necessary to reduce the scope and value of the experiments and delay the time at which the Saturn V Workshop can be available for use.

It is important to recognize that the Saturn I Workshop and Saturn V Workshop will represent very major steps forward in earth orbital manned space flight and its use for benefits here on earth. These steps go considerably beyond the Apollo program and the Department of Defense's Manned Orbiting Laboratory.

For example, the Saturn V Workshop will be 22 feet in diameter as compared to 10 feet for the MOL. Its pressurized volume will be 10 times that of the MOL and it will comfortably accommodate 6 to 9 men compared with very limited space for 2 in the MOL and 3 in Apollo. It will be designed to be placed in orbit and its stay time developed for continuous or repeated use over an indefinite period, as compared to 30 days useful life in orbit planned for the MOL and about 14 days for Gemini and Apollo. These comparisons show that in the Apollo Applications program, even though our plans are now sharply curtailed from what they were 18 months ago, our country will be making very significant advances in manned space flight.

3. With respect to the continuation of the Saturn IB and Saturn V production lines, which are funded in the Apollo Applications Program budget item, the future is very uncertain. The President's FY 1969 budget provided funds for continuing production of Saturn IB's and Saturn V's at a rate of 2 per year of each, after the 12 Saturn IB's and 15 Saturn V's which are being funded in the Apollo program. We must now state, however, that the reductions that have been made by the House in the FY 1969 budget, and the limitations under which we must proceed into 1969, raise serious doubts as to whether we can continue production of both of these launch vehicles. We may find it necessary to interrupt the production of both. I must also say that our consideration within NASA and with the Department of Defense of the future national requirements for large launch vehicles has moved more slowly than I have hoped, and has not yet progressed to the stage where we can state with confidence what these requirements will be. For launch vehicles in the Saturn IB class and up to the 100,000-pound class, the present indications are that the most significant requirements are for revisit, resupply, and reuse of orbital systems like the Saturn I and Saturn V Workshops or space stations of the more distant future. For the Saturn V class of vehicles, the principal future requirements will relate to continued exploration of the moon, launch of the Saturn V

and successor Workshops, and the flight test and ultimate use of nuclear propulsion, with perhaps a possibility of launching very large payloads at some time in the future.

Because of the severity of present fiscal constraints, our immediate task is to decide whether we can fund production of the Saturn V after the first 15, bearing in mind the possibility that these first 15 vehicles may all still be required to accomplish the first landings on the moon. We must assess the serious position the nation would be in if it becomes necessary to suspend production of our largest launch vehicle.

To assist us in these judgments, we have recently entered into a contract with the Chrysler Corporation under which they will work with the various producers of stages or vehicles in the national launch vehicle program to make detailed studies of alternative launch vehicles, including improvements that will be available in the next few years to reduce costs and improve performance. To assure that these studies will have the greatest validity and utility possible, arrangements are being made for top experts in the companies cooperating with us and with Chrysler to participate in the working groups so that the results will enable needed comparisons and be of the greatest value to both NASA and the Department of Defense.

In view of the conditions we now face, it is practically certain that we will find it impossible to avoid an extended

period in which there are few or no large payload launches in the 1970's. Up to this time it has been my hope that we could proceed with production of 2 Saturn IB's and 2 Saturn V's as planned in the FY 1969 budget to permit us to concentrate on filling this payload gap when we decided to resume launches rather than to face the added problems and heavy penalties of starting up booster production again after disbanding the teams now at work. Even if long-term future requirements for large launch vehicles cannot be clearly decided for another year, I am confident that the nation can put 2 more vehicles of each type to good use. I do not believe that we should terminate production of either of them unless and until it is clearly established that we do not need them or that financial considerations must override our national position in space and that funds cannot be made available to support a civil or military space program that includes large payloads.

4. For nuclear propulsion development, the President's budget recommendations included \$60 million to provide for initiation of the development of the NERVA 75,000-pound class engine as well as for completing the present program of experimental engine tests and the necessary continuing supporting research and technology effort. As the members of this Subcommittee know, we have strongly supported the development of nuclear propulsion for space and the importance of proceeding

with the development of a flight qualified engine at this time. We have testified at length on this program at the recent special series of hearings held by the Senate Committee on Aeronautical and Space Sciences. That Committee has recommended restoration of funds for this development. The four main reasons I gave in my testimony to the Committee as to why it is important for the United States to proceed with the development of nuclear rocket propulsion at this time were:

First: During the second decade of the space age we will undoubtedly find that there are important civil or military requirements for space vehicles and missions requiring nuclear propulsion or for which it will provide decisive advantages.

Second: As in other fields of advanced technology, the nation should not short-sightedly cut off the development of new technology of great promise because specific requirements or applications cannot be clearly identified and fully justified in advance. The lead-time for advanced propulsion is long. Thus it is the promise and not some specific mission requirement that is important.

Third: It is very important that we move ahead with nuclear rocket engine development in FY 1968 and FY 1969 to give a clear signal that the United States does not intend to limit its development of large launch vehicle and payload capabilities to those of the Saturn V class space booster.

Fourth: It is important to proceed with the development of a nuclear rocket engine at this time to serve as a central focus for continuing advance in the nuclear and other technologies involved. It is very likely that we will find over the next half dozen years important benefits and applications in other fields coming out of the work on nuclear propulsion, so much of which is at the most advanced boundaries of our current knowledge of materials and other areas of technology.

The action of the House in reducing the authorization for the nuclear propulsion program to \$11.7 million is a serious blow to our future in space. This action of the House is inconsistent with its action a few days earlier in approving the authorization of \$69 million -- virtually the full amount of the budget request -- for the Atomic Energy Commission's portion of the program. The Senate Committee on Aeronautical and Space Sciences is recommending that \$55 million be authorized for NASA for nuclear propulsion. Even if this is the final action of the Congress it is doubtful that we will be able to reprogram sufficient funds within a \$4 billion total to proceed with the development of the NERVA engine. To proceed with NERVA while terminating Saturn V production cannot be justified. In this, as in other areas, we will have to allocate funds appropriated for FY 1969 to meet the most critical immediate needs. Few long term needs can be met.

5. One of the most important decisions in the President's FY 1969 Budget for NASA was in the planetary program. Last year we proposed to begin work toward the launch in 1973 and 1975 of large and highly sophisticated Voyager spacecraft toward Mars -- at a cost of about \$2 billion. Sufficient funds to begin Voyager were not appropriated, and the program was not initiated. This left the planetary program with no approved missions after the Mariner-Mars '69 mission. We now propose in Fiscal Year 1969 to initiate a program more limited than Voyager for continuing the exploration of Mars in 1971 and 1973 at about one-fourth the cost of Voyager. This program would include two Mars orbiters of the Mariner-class spacecraft in 1971 and two orbiters with survivable rough-landers to test conditions on the Martian surface in 1973. The 1973 orbiters will be launched on the Titan III launch vehicle.

We believe that, if we can start this year, we can produce the spacecraft and ready the launch vehicles for launch at the appropriate times in 1971 and 1973. I should emphasize that while these Mars missions are less ambitious and far less costly than those we proposed with the Voyager, they will nevertheless maintain us in a posture of continuing useful and efficient exploration of the near planets and will continue the feedback of valuable information about our neighbors in the solar system.

6. In planning our program for FY 1969 we have continued to place special emphasis on aeronautics, with particular attention being directed to the problems of noise reduction and the control and handling of vertical and short take-off and landing aircraft. We have made significant progress in recent years in our understanding of the continuum of air and space technology and in the interrelation of the problems we encounter and the solutions that can be found in aircraft and spacecraft. Today we are close to proving concepts which can bring about major improvement in the stability and control and hence the safety of aircraft and major reduction in the level of noise created by operating aircraft. With adequate funding for our in-house and our contracted efforts we can continue to bring about the direct pay-offs possible through aeronautical research and development. At NASA centers and through NASA contracts, we are at work today in close coordination with the Department of Defense and the Department of Transportation, on the problems being encountered in and on design improvements for many military aircraft and the SST. We hope total funds for FY 1969 are sufficient to permit us to increase our efforts in these areas.

7. In conclusion, I wish to return to the critical area of so-called "Administrative Operations." This appropriation

title is really a misnomer, since it provides the funds for salaries and expenses of technical operations throughout NASA -- in our laboratories, like Goddard, Langley, Ames, and the others; at our development centers like the Marshall Center at Huntsville and the Manned Spacecraft Center at Houston; at our launch centers at Wallops Island, the Western Test Range, and of course Cape Kennedy, -- as well as the technical and business management of our contracts and expenses that fit the usual concept of "Administrative Operations." Program items and elements of cost which can be more effectively and economically managed as a whole, such as personnel, travel, general purpose ADP, range operations, utilities, and the collection and dissemination of scientific and technical information are included in the Administrative Operations appropriation even though they directly support the Research and Development effort.

Personnel related costs account for 68% of the total Administrative Operations appropriation, and, in turn, 70% of NASA personnel are scientists, engineers and technicians directly involved in the NASA research and development program. At no time in NASA's history has this workforce been more important to the accomplishment of NASA's missions. As the Apollo program moves from the design and development phase into the test and operational phase, and as launch vehicles and spacecraft are

delivered for testing, integration, checkout and launch, the center of activity shifts from industry to the NASA in-house facilities. To accomplish these tasks, NASA's in-house capabilities, in terms of both facilities and manpower, have been carefully developed through the Mercury program, the Gemini program, and the unmanned flight testing of the Saturn boosters and the Apollo spacecraft. The level of activity in terms of spacecraft hours in space and manhours in space required to accomplish the flight test program and the lunar landing and return in the Apollo program is several times that required during either the Mercury or Gemini programs. It is this level of support to which NASA's in-house resources must now be applied -- and these resources are provided under the Administrative Operations appropriation.

The President's Budget recommendation of \$648.2 million for Administrative Operations consists of a \$628 million base -- the amount appropriated for Administrative Operations for FY 1968 -- adjusted only for the cost of the first increment of the 1967 Federal Employees Pay Act salary increase and for the cost of converting certain support contracts to civil service operations. Absorbed in the 1969 budget request within the \$628 million base is the projected 1969 growth at the Electronics Research Center in Cambridge, the completion of the growth at the Kennedy Space Center related to the operational phases of the manned Apollo

flight, and the cost of longevity and career development pay increases for the civil service staff.

As I stated earlier, the House reduction in the Administrative Operations appropriation to the \$603.2 million level would require reduction in NASA personnel that is out of line with the workload and requirements of the high priority programs now underway. To achieve the number of position reductions necessary to reflect this dollar reduction would require the separation of significant number of NASA employees, taking into account corresponding reductions in the other cost categories in Administrative Operations. If a reduction-in-force could be initiated early enough to have all the necessary positions vacated by July 1 -- and I doubt whether all the necessary steps could be taken that soon -- a reduction-in-force of more than 3,600 employees would be necessary to accommodate the House reduction to the \$603.2 million level. Any delay in initiation of the reduction-in-force action beyond July 1 would greatly increase the required number of separations. For example, if all affected employees were to leave the rolls on September 1 a reduction-in-force of approximately 4,900 employees would be required. Such an action would jeopardize NASA's ability to effectively manage and monitor the ongoing

programs and to do the advanced planning necessary to tailor future programs to the resources available.

Mr. Chairman, this concludes my statement. I am submitting for the record a more detailed statement summarizing our FY 1969 Budget estimates.

Table 1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION - FY 1969

(in thousands)

	<u>1969 Budget</u>	<u>Authorizations Passed by House (H.R.15856)</u>	<u>Appropriations Passed by House (H.R.17023)</u>	<u>Authorizations Recommended by Senate Committee</u>
Research and Development	\$3,677,200	\$3,383,250	\$3,383,250	\$3,475,400
Construction of Facilities	45,000	45,000	21,800	39,600
Administrative Operations	<u>648,200</u>	<u>603,173</u>	<u>603,173</u>	<u>635,560</u>
Total NASA	\$4,370,400	\$4,031,423	\$4,008,223	\$4,150,560